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Timothy N Trop
Trop Pruner & Hu P C
8554 Katy Freeway, Suite 100
Houston, TX 77024

EXAMINER	
WHIPKEY, JASON T	
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 21

Application Number: 09/106,994
Filing Date: June 29, 1998
Appellant(s): MORRIS ET AL.

Fred G. Pruner, Jr.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed February 9, 2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1, 3-6, 8-10, and 18-28 do not stand or fall together and provides reasons as set forth in 37 C.F.R. § 1.192(c)(7)-(c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,754,229	ELABD	5-1998
4,845,540	BAKER et al.	4-1989
5,872,596	YANAI et al.	2-1999

(10) Grounds of Rejection

The following grounds of rejection are applicable to the appealed claims:

A. Claims 1, 4, 6, 9, 18, 19, 21, and 22-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Elabd (U.S. Patent No. 5,754,229) in view of Baker (U.S. Patent No. 4,845,540).

Regarding claim 1, Elabd shows an image sensor in Figure 3 with an array 480 of pixel sensors 484. Color filters 462 placed in wheel 460 (see Figure 2) are used in front of the image sensor (see column 4, lines 24-29) to allow each pixel sensor to capture and integrate the red, green, and blue components of an image individually (see column 4, lines 50-52). Array 480 also includes storage register 490 (see Figure 3) for separately storing the red, green, and blue

charge packets integrated by the pixel sensors from successive color exposures (see column 5, lines 21-25).

Elabd is silent with regard to coupling the photosensitive elements to the storage locations *during* the integration intervals.

Baker shows a single pixel from an imaging device in Figure 2. Pixel sensor 1 produces a current signal that is directly integrated by alternately switchable storage capacitors 2a and 2b (see column 9, lines 34-45). Flip-flop circuit 17 alternately couples pixel sensor 1 to capacitor 2a and capacitor 2b (see column 10, lines 28-42). Therefore, capacitor 2a integrates charge during a first integration interval and capacitor 2b integrates charge during a second integration interval.

As stated in column 9, lines 46-52, an advantage to using a storage location to integrate current directly from a photodetector element is that the photodetector element may be operated continuously, since the photodetector need not halt operation in order to transfer integrated charge. For this reason, it would have been obvious at the time of invention to have Elabd's sensor integrate charge directly in the storage locations.

Regarding claim 4, Elabd teaches that analog charges are stored (see column 2, lines 62-65).

Claim 6 may be treated like claim 1. Additionally, Elabd shows in Figure 10 that the invention may be incorporated in a camera. Interface device 92 acts as a controller for filter wheel 82 (see column 9, lines 11-13), which causes each pixel sensor to capture one color component at a time.

Claim 9 may be treated like claim 4.

Claim 18 may be treated like claim 1.

Regarding claim 19, Elabd teaches, as described above, that color filters 462 placed in wheel 460 are used in front of the image sensor to allow each pixel sensor to capture and integrate the red, green, and blue components of an image individually.

Regarding claim 21, Elabd shows in Figure 3 that pixel sensors 484 are in an array 480.

Claim 22 may be treated like claim 1.

Regarding claim 23, Elabd teaches, as described above, that storage register 490 included in array 480 separately stores the red, green, and blue charge packets integrated by the pixel sensors from successive color exposures.

Claim 24 may be treated like claim 23.

Regarding claim 25, since Elabd teaches that separate red, green, and blue storage registers may be used to store integrated red, green, and blue charges *and* Baker teaches that integrating charge directly into storage capacitors is advantageous (for reasons described above), it would have been obvious to one of ordinary skill in the art to integrate red, green, and blue charges directly into red, green, and blue storage capacitors.

Claim 26 may be treated like claim 25.

Claim 27 may be treated like claim 25.

Claim 28 may be treated like claim 25.

B. Claims 3, 5, 8, 10, and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Elabd (U.S. Patent No. 5,754,229) in view of Baker (U.S. Patent No. 4,845,540) and further in view of Yanai (U.S. Patent No. 5,872,596).

Claim 3 may be treated like claim 1. However, Elabd and Baker are silent with regard to including an A/D converter in the circuitry of each pixel sensor.

Yanai discloses an image pickup device with pixels, as shown in Figure 34. Each pixel includes A/D converter 11, which allows a digital signal to be stored in the pixel's shift register 12. As stated in column 29, lines 32-37, an advantage to associating an A/D converter with each pixel is that there is a reduction in the amount of analog information transfer that occurs in the image pickup device, which results in an image of higher quality. Therefore, it would have been obvious to have the image sensor described by Elabd perform A/D conversion within each pixel.

Claim 5 may be treated like claim 3.

Claim 8 may be treated like claim 3.

Claim 10 may be treated like claim 3.

Claim 20 may be treated like claim 3.

(11) Response to Argument

A. The Appellant argues that the examiner has failed to establish a *prima facie* case of obviousness in the rejection of claim 1 because without the hindsight gleaned from the claimed invention, one skilled in the art would not have been motivated to modify Elabd so that integration is performed directly by Elabd's storage register, thus bypassing the image register as an integrator.

However, Appellant admits that the motivation cited by the examiner in Baker (column 9, lines 46-52) "may, at most, arguably motivate one skilled in the art to include multiple

integrating capacitors in Elabd's image register for each pixel" (brief, p. 17, para. 1). This motivation is all that is necessary to derive Appellant's claimed invention, since the capacitors 2a and 2b disclosed by Baker are *storage* capacitors (Baker, column 5, line 3) that integrate and store produced charges.

While the Appellant accepts Baker's teaching that motivation exists to include multiple integrating capacitors in each of Elabd's pixels, the Appellant ignores Elabd's teaching that one separate integration occurs per color (column 5, lines 59-65) *and* Baker's teaching that individual integrations are stored in individual capacitors (column 9, lines 34-45). Combining these teachings using the motivation described in Baker results in the Appellant's claimed invention and renders the Appellant's apparent argument over the physical location of the integrating capacitors specious.

B. The Appellant argues that the examiner has failed to establish a *prima facie* case of obviousness in the rejection of 8 because without the hindsight gleaned from the claimed invention, one skilled in the art would not have been motivated, in combining Elabd and Baker, to associate each of Baker's storage capacitors with a particular color component.

While Baker does not disclose associating individual storage capacitors with individual color components, Elabd *does* disclose associating individual storage locations with individual color components. When the teachings of the two references (i.e., Elabd's teaching that one separate integration occurs per color and Baker's teaching that individual integrations are stored in individual capacitors) are combined using the motivation described in Baker, one arrives at the claimed invention.

C. The Appellant argues that the examiner has failed to establish a *prima facie* case of obviousness in the rejection of claim 18 because without hindsight gleaned from the claimed invention, one skilled in the art would not have been motivated, in combining Elabd and Baker, to associate each of Baker's storage capacitors with a particular color component.

While Baker does not disclose associating individual storage capacitors with individual color components, Elabd *does* disclose associating individual storage locations with individual color components. When the teachings of the two references (i.e., Elabd's teaching that one separate integration occurs per color and Baker's teaching that individual integrations are stored in individual capacitors) are combined using the motivation described in Baker, one arrives at the claimed invention.

D. The Appellant argues that the examiner has failed to establish a *prima facie* case of obviousness in the rejection of claim 22 because without hindsight gleaned from the claimed invention, one skilled in the art would not have been motivated, in combining Elabd and Baker, to associate each of Baker's storage capacitors with a particular color component.

While Baker does not disclose associating individual storage capacitors with individual color components, Elabd *does* disclose associating individual storage locations with individual color components. When the teachings of the two references (i.e., Elabd's teaching that one separate integration occurs per color and Baker's teaching that individual integrations are stored

in individual capacitors) are combined using the motivation described in Baker, one arrives at the claimed invention.

E. The Appellant argues that the examiner has failed to establish a *prima facie* case of obviousness in the rejection of claims 25-28 because without hindsight gleaned from the claimed invention, one skilled in the art would not have been motivated, in combining Elabd and Baker, to include more than two storage capacitors per pixel cell.

Elabd's salient teaching is that a pixel in an image-sensing device can be used to capture a plurality of different colors using a rotatable color filter placed in front of the image-sensing device and separate storage areas for each color signal integrated by each pixel. Baker teaches why it would be advantageous to integrate charge from each integration directly into a storage location.

Appellant ignores Elabd's teaching that one separate integration occurs per color (column 5, lines 59-65) and Baker's teaching that individual integrations are stored in individual capacitors (column 9, lines 34-45). Combining these teachings using the motivation described in Baker, one of ordinary skill in the art would find it obvious to implement storage capacitors commensurate in quantity to the number of integrations performed by Elabd's device.

While the examiner agrees that Baker does not disclose a storage capacitor associated with individual color components, Elabd *does* disclose a plurality of storage areas, each associated with an individual color component.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

JTW

JTW
March 19, 2004

Conferees:
Ngoc-Yen Vu N. Vu
Wendy Garber

WENDY R. GARBER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Timothy N. Trop
Trop Pruner & Hu P C
8554 Katy Freeway, Suite 100
Houston, TX 77024